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(19) (CA) **APPLICATION FOR CANADIAN PATENT** (12)

(54) Water Reuse Toilet Tank System

(72) Sayant, Eric H. - Canada ;

(71) Same as inventor

(57) 20 Claims

5,084,8/69

Notice: This application is as filed and may therefore contain an incomplete specification.

**Canada**

CCA 3254 (10-92) 41 7530-21-936-3254

2093247

ABSTRACT

This invention relates to reuse of bath and  
shower water for the purpose of flushing toilet  
5 wastes by means of a new toilet holding tank system.

WATER REUSE TOILET TANK SYSTEMBACKGROUND OF THE INVENTION

This application pertains to the reuse of waste bath and shower water for use in flushing toilet waste and more specifically related to this function in multi-story buildings. With the addition of a pump this system may be adapted for use in single story dwellings.

The growing shortage of a fresh water supply in many areas makes it imperative to use this resource as wisely as possible.

The common flush toilet in use today uses approximately 2 to 2 1/2 gallons of fresh water per flush. A household of four people in normal conditions can be expected to flush between 50 and 60 gallons of clean fresh water down the drains each day.

The normal bath or shower, depending on individual users, will average about 15 gallons per use. Therefore, a household of four with one bath or shower per person per day would produce about 60 gallons of waste water per day. This waste water when reused by means of a new toilet tank holding system makes it possible to maintain sanitary conditions within a dwelling with a minimal use of limited fresh water resources.

This invention, in addition to reducing use of fresh water, would also significantly reduce volume of waste water to be treated in sewage treatment plants.

This invention would consist of a holding tank about 24" x 10" x 72" holding approximately 30 gallons of tub and shower waste water. This tank would replace the existing toilet tank and could be used in conjunction with existing bowl. The flushing mechanism would be similar to ones already in use on conventional toilet tanks and the fresh water supply would remain as it was in

the original toilet tank to ensure normal operation of toilet when holding tank was depleted of tub and shower waste water.

The fresh water supply inlet mechanism would be designed to create a spray while refilling. thus rinsing the inside of the holding tank when supply of waste water has been exhausted.

The majority of multi-story buildings are designed with bathroom facilities directly above each other. In order to make plumbing hookups as easy as possible, this being the case, bath and shower waste water can easily be redirected to supply the new toilet holding tank.

This tank would have an intake line from the tub or shower on the level above and be equipped with an overflow system to ensure when toilet holding tank is full, any additional water coming to the tank would simply follow its original path and drain normally.

This tank would be equipped with a removable filter screen just below the waste water intake line to ensure undesirable materials (such as hair) would not enter the system. A second screen would be suspended from the first where a disinfectant and defoaming agent would be placed. The use of a disinfectant and defoaming agent will ensure no unpleasant appearance or odours exist in the bowl.

These screens will be easily removed to allow for cleaning and replacement of disinfectant and defoaming agent. It would also be recommended that tub and shower drains be equipped with straining devices already in production.

The new toilet holding tank will also be equipped with a fastening system to secure holding tank to the wall behind and above the toilet bowl and support the considerable weight of the holding tank when full.

#### SUMMARY OF INVENTION

Several patents have been issued with respect to the recycling of waste water for the purpose of flushing toilet waste.

For example, Toms U.S. Patent No. 4,115,879,

Jennings U.S. Patent No. 3,318,449 and Kimball U.S. Patent No. 5,084,920. All of these systems recover waste water from a variety of sources eg. tub, shower, sinks, washing machines etc. and store waste water in large holding tanks requiring pumps to fill toilet holding tanks.

These systems have two problems. The first being the multiple sources of waste water such as washing machines, dishwashers and sinks. Much of the waste water from these sources contain strong detergents and other debris - difficult to filter. This new toilet holding tank system reuses only the cleanest of waste water from bath and showers, containing only mild soaps, making the defoamitive and disinfecting of it relatively easy.

The second and much more significant problem with previous systems is the need for a pump and large holding tanks requiring extensive new plumbing lines. These systems would be extremely expensive and very difficult to refit in existing buildings. They also require a considerable amount of space and are not suitable for use in apartment buildings, hotels and similar buildings.

This new system, however, requires only the space behind and above the toilet bowl. It is also gravity fed so no pump is required.

The refit of this system requires only the replacement of existing toilet tank with this new toilet tank holding system with a minimal amount of plumbing needed to divert bath and shower water from bathroom on level above to new toilet holding tank.

The tank itself can be easily covered by a false cupboard making it pleasing to the eye as well as covering area of plumbing refit, thus negating the need for expensive patching in ceiling area.

This system can be used in most multi-story dwellings with existing plumbing at a very reasonable cost.

As well as saving fresh water resources, and demand on sewage systems, this new toilet tank holding system would be cost-effective to the consumer by reducing water usage fees which in some areas have become quite expensive.

BRIEF DESCRIPTION OF DRAWING

Fig. 1

Front view of new reused water, toilet holding tank showing conventional plumbing connections as well as new tank and connections necessary to access new source of tanks main water supply. 1. Removable fine screen used to filter out undesirable elements such as hair. 2. Small brackets built to support filter screen. 3. Main body of new toilet holding tank height 72" width 24" depth 10", 4. Spray nozzle used to rinse inside of tank while filling to normal flush level at times when reused water in tank is depleted and the original fresh water source is needed. 5. Fresh water inlet and shut off assembly. 6. Fresh water inlet line. 7. Conventional toilet bowl. 8. Conventional float. 9. Screen suspended from filtering screen and used to hold disinfectant and defoaming agent. 10. Disinfectant and defoaming agents. 11. Overflow line allowing excess water to pass on its original course when toilet holding tank is full. 12. Removable tank lid to allow easy access to remove screens for cleaning and replacing disinfectants and defoaming agents. 13. Incoming line allowing used bath and shower water to supply toilet holding tank.

Fig. 2

Side view of new toilet holding tank, showing location in relation to wall behind original toilet bowl. 14. Brackets built into back of toilet holding tank designed to hook on brackets connected to wall to enable wall structure to support weight of toilet holding tank when full. 15. Original drain pipe in building.

FIG. # 3

Cross-section of building showing basic application of new reused toilet tank holding system. Plumbing hook ups would vary somewhat depending on individual building design.

PREFERRED EMBODIMENTS

Reused water toilet holding tank would be of a size 72" high x 24" wide and 10" dep and be constructed of durable plastic or fiber-glass which would have built-in girts on the interior in order to keep tank form stable under the pressure of a full tank. A sealed access panel in read of tank would enable easy access for maintenance, cleaning, or replacement of defective parts. The use of durable plastic or fiber-glass would be

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desirable because of strength, light weight and ease of molding.

The size and construction materials could be varied for more specific uses where necessary.

## I Claim:

1. A toilet holding tank for disposition above a toilet bowl, means for gravity feeding water retained therein to said bowl during flushing thereof, an inlet adjacent the top of the tank for receiving gravity fed waste water from an external source into the tank, and a filter contained within the tank positioned so that said waste water passes therethrough before settling in said tank.

2. A tank as defined in claim 1 further including means for retaining disinfectant and a defoaming agent within the tank in a position so that said waste water passes therethrough before settling in said tank.

3. A tank as defined in claim 2 in which said retaining means is suspended below the filter.

4. A tank as defined in claim 2 in which said retaining means is comprised of said filter.

5. A toilet tank as defined in claim 1 including a fresh water inlet and valve controlled by a float, including means for spraying fresh water from the fresh water inlet against inner sides of the tank, the float being suspended at a distance from the bottom of the tank whereby it floats and causes closure of the valve when sufficient water is retained by the tank below the float for a single flush of the bowl, the tank having capacity of a plural multiple of said sufficient water for a single flush.



6. A tank as defined in claim 5 further including means for retaining disinfectant and a defoaming agent within the tank in a position so that said waste water passes therethrough before settling in said tank.

7. A tank as defined in claim 6 in which said retaining means is suspended below the filter.

8. A tank as defined in claim 6 in which said retaining means is comprised of said filter.

9. A waste water reuse system comprising:

(a) a washing utility having a waste water drain,

(b) a waste water tank located on a lower building floor below a floor on which the washing utility is located,

(c) a drain pipe extending from the drain into the tank for gravity feeding the waste water for retention therein,

(d) a filter positioned so that the waste water passes therethrough before settling in the tank, and

(e) gravity fed reusing means for receiving the waste water retained within the tank on said lower building floor.

10. A system as defined in claim 9 in which the filter is contained within the tank.

11. A system as defined in claim 10 in which the reusing means is a toilet bowl disposed below the tank, and flushing means for allowing a predetermined amount of the water retained within the tank to enter and flush the toilet bowl.

12. A system as defined in claim 11 including an overflow drain located adjacent the top of the tank, and means connected to the overflow drain for carrying overflow water to a main building drain.

13. A system as defined in claim 11 further including means for retaining disinfectant and a defoaming agent within the tank in a position so that said waste water passes therethrough before settling in said tank.

14. A system as defined in claim 13 including a fresh water inlet and valve controlled by a float, including means for spraying fresh water from the fresh water inlet against inner sides of the tank, the float being suspended at a distance from the bottom of the tank whereby it floats and causes closure of the valve when sufficient water is retained by the tank below it for a single flush of the bowl, the tank having capacity of a plural multiple of said sufficient water for a single flush.

15. A system as defined in claim 14 including a vertical separator wall on each of plural stories of a building coextending one from the other, one of said washing utilities on a side of each wall, one of said tanks and toilets on the other side of each wall, and a waste water drain from each washing utility which has a tank and toilet on a storey below it

extending from the washing utility through a  
corresponding separation wall and floor into the tank  
below it for gravity feeding waste water into the tank  
below it for retention therein.

16. A system as defined in claim 11 in  
which each tank has an overflow drain located adjacent  
the top of the tank, and means connected to the overflow  
drain for carrying overflow water to a main building  
drain.

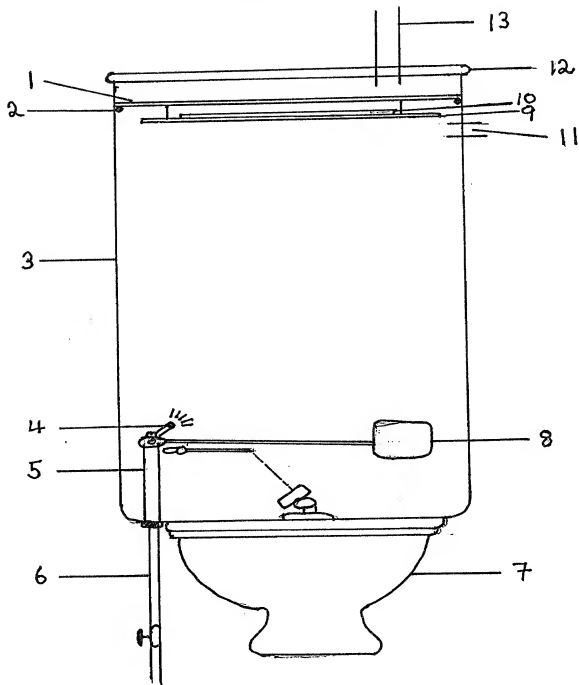
17. A system as defined in claim 11 in  
which each tank has a fresh water inlet and valve  
controlled by a float, including means for spraying  
fresh water from the fresh water inlet against inner  
sides of the tank, the float being suspended at a  
distance from the bottom of the tank whereby it floats  
and causes closure of the valve when sufficient water is  
retained by the tank below it for a single flush of the  
bowl, the tank having capacity of a plural multiple of  
said sufficient water for a single flush.

18. A system as defined in claim 15 in  
which each tank has a fresh water inlet and valve  
controlled by a float, including means for spraying  
fresh water from the fresh water inlet against inner  
sides of the tank, the float being suspended at a  
distance from the bottom of the tank whereby it floats  
and causes closure of the valve when sufficient water is  
retained by the tank below it for a single flush of the  
bowl, the tank having capacity of a plural multiple of  
said sufficient water for a single flush.

19. A system as defined in claim 9  
including a vertical separator wall on each of plural  
stories of a building coextending one from the other,  
one of said washing utilities on a side of each wall,  
5 one of said tanks and toilets on the other side of each  
wall, and a waste water drain from each washing utility  
which has a tank and toilet on a storey below it  
extending from the washing utility through a  
corresponding separation wall and floor into the tank  
10 below it for gravity feeding waste water into the tank  
below it for retention therein.

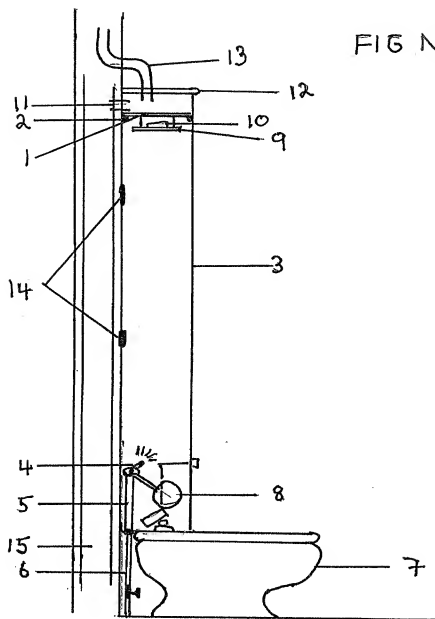
20. A system as defined in claim 19 in  
which each washing utility is comprised of a tub or  
shower.

FIG. NO. 1



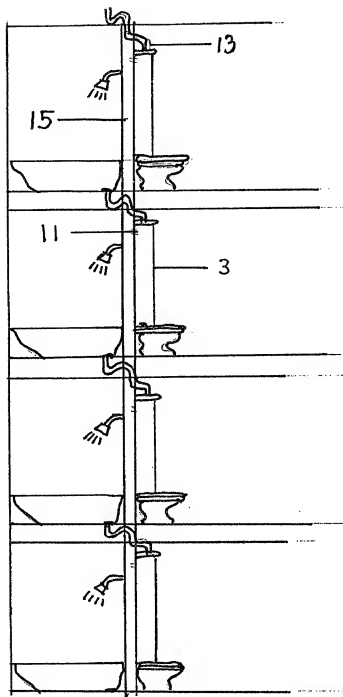
*Pascal & Associates*  
Agents for applicant

FIG NO. 2



*Pascual Associates*  
Agents for applicant

FIG No. 3



*Pascal & Associates*  
Agents for applicant

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DERWENT-WEEK: 199501

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**TITLE:** Water reuse toilet tank system  
has fresh water inlet and valve  
controlled by float, and nozzle for  
spraying fresh water against sides  
of tank

**INVENTOR: SAYANT E H****PATENT-ASSIGNEE: SAYANT E H[SAYAI]****PRIORITY-DATA: 1993CA-2093247 (April 2, 1993)****PATENT-FAMILY:**

<b>PUB-NO</b>	<b>PUB-DATE</b>	<b>LANGUAGE</b>
CA 2093247 A	October 3, 1994	EN

**APPLICATION-DATA:**

<b>PUB-NO</b>	<b>APPL- DESCRIPTOR</b>	<b>APPL-NO</b>	<b>APPL- DATE</b>
CA 2093247A	N/A	1993CA- 2093247	April 2, 1993

**INT-CL-CURRENT:**

<b>TYPE</b>	<b>IPC DATE</b>
CIPS	E03D5/00 20060101



**ABSTRACTED-PUB-NO: CA 2093247 A**

**BASIC-ABSTRACT:**

The system includes a toilet holding tank disposition above a toilet bowl, member for gravity feeding water retained in it to the bowl during flushing an inlet adjacent the top of the tank for receiving gravity fed waste water from an external source into the tank, and filter contained within the tank positioned so that the waste water passes through it before settling in the tank.

the tank further includes a member for retaining disinfectant and a defoaming agent within the tank in a position so that the waste water passes through it before settling in the tank.

**ADVANTAGE - Reduces volume of waste water to be treated in sewage treatment plants.**

**CHOSEN-DRAWING: Dwg.1/3**

**TITLE-TERMS: WATER REUSE TOILET TANK  
SYSTEM FRESH INLET VALVE  
CONTROL FLOAT NOZZLE SPRAY  
SIDE**

**DERWENT-CLASS: Q42**

**SECONDARY-ACC-NO:**

**Non-CPI Secondary Accession Numbers: 1995-000124**